



# LOAD RESTRAINT CERTIFICATION

Bulk Loads – Sheet Product

**USG BORAL**  
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[USGBoral.com](https://www.usgboral.com)

Interior Linings

Ceilings

Cornice

Finishes

Systems Solutions

# THIS CERTIFICATION

- Provides a certified engineering system for the restraint of bulk loads of USG Boral Lightweight Building Products, transported by road in Australia.
- Covers: loose and palletised sheet product with a minimum of 15 sheets, palletised cornice product, steel framing and palletised compounds (bags and buckets) packed to meet the NTC performance standards and the NTC load restraint guide.

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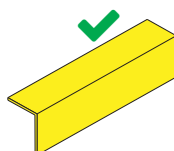
## Load Restraint Equipment and Key Requirements

- ✓ All webbing straps shall comply to AS/NZ 4380, with less than 10% wear.
- ✓ 50mm straps or larger may be used for tie down over freight with push up ratchets (300kg resulting average pre-tension over the load).
- ✓ 50mm straps or larger may be used for tie down over freight with drum winches (300kg resulting average pre-tension over the load).
- ✓ 50mm straps may be used for tie down over freight with pull down ratchets (600kg resulting average pre-tension over the load).
- ✓ 50mm straps may be used for cross over lashings with pull down ratchets (600kg resulting average pre-tension over the load).
- ⚠ Stability of vehicles and product stacks can be impacted by high load heights.
- ⚠ Drum winches are not suitable for tensioning of cross over straps.
- ⚠ Any single package must have a minimum of 15 sheets.
- ✗ Do not leave items loose on the vehicle. Always secure within a box or crate.
- ✗ Do not use chains.
- ⚠ Steel pallets must have industrial rubber or rough sawn timber material placed under them to remove the steel on steel low friction surface contact.
- ⚠ Dunnage should be aligned vertically when placed in multiple layers.
- ⚠ Timber dunnage may not have rounded corners.
- ⚠ Throwing webbing is a manual handling risk. Use caution when applying lashings and check the other side of the trailer is clear when throwing lashings.
- ✓ Loads should be blocked against a suitably engineered headboard/ surface wherever possible or cross over lashings (see page 8).
- ✓ Steel packs must be packaged to meet the Performance Standard Forces in the NTC Load Restraint Guide.

## Approved ratchet types

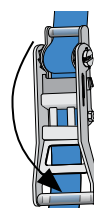
### Corner protectors

Shall be used under all webbing straps – USG Boral’s patented Edge Protector product available at USG Boral stores



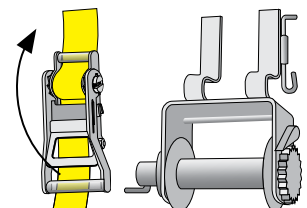
### Pull down ratchet

600kg averages pre-tension over load



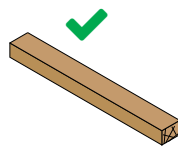
### Push up ratchet and common drum winch

300kg average pre-tension over load

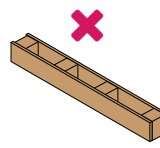


### Tensioner types and application for restraint

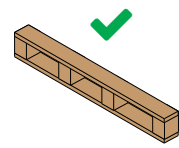
Lashing configuration		Tie down	Cross over strap
Tensioner type	Drum winch	✓	✗
	Push up hand ratchet	✓	✗
	Pull down hand ratchet	✓	✓



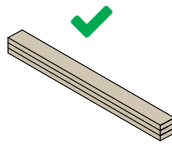
Solid timber dunnage with a rough sawn surface is acceptable



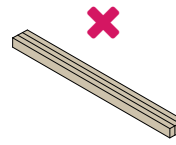
Do not use fabricated timber dunnage with boards vertical



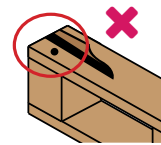
Fabricated timber dunnage must be used with boards horizontal tyne pockets open



Glued plasterboard and plastic wrapped plasterboard dunnage is acceptable



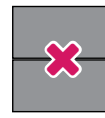
Do not use glued or plastic wrapped dunnage with boards vertical



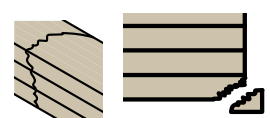
Fabricated timber dunnage must be in good condition, with no loose or damaged boards



Do not use rectangular dunnage on short edge

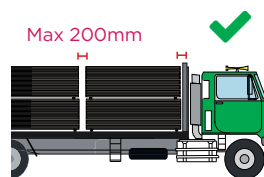


Do not double stack dunnage

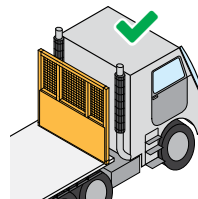


Do not use glued or plastic wrapped dunnage with boards vertical

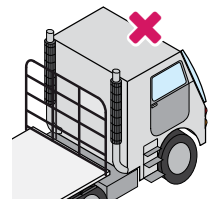
### Blocking Requirements - Headboards



Blocking to headboard preferred; Max 200mm gap between packs and blocking surface

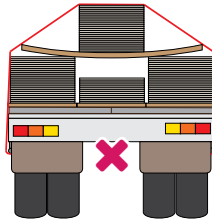


Headboards must be suitably engineered to 30% of payload

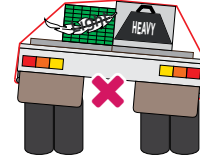


Pipe gates are not suitable for blocking for these product types

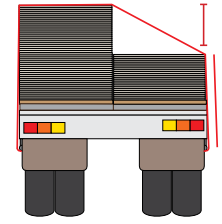
**Load Configurations – Sheet Product**



Do not bridge dunnage

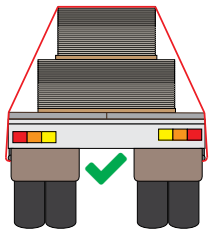


Avoid imbalanced loads

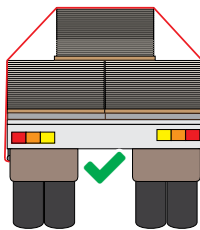


No more than 300mm

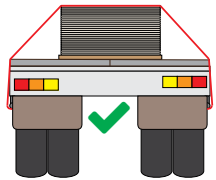
Two abreast packs maximum height difference is 300mm



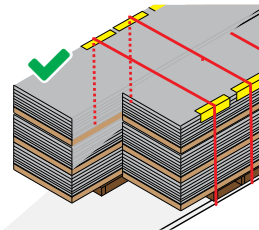
Stack narrow packs on top of wide packs



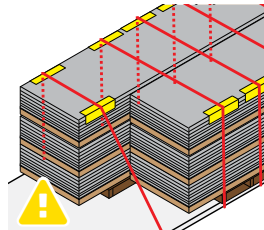
Pyramid stack loads of three bundles



Load single packs centrally on the deck

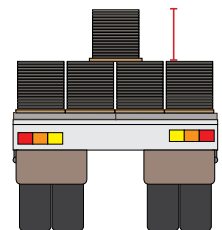


Lashings must be applied to all stacks across the deck



Lashings applied over part of the load are not counted in total lashing requirements in tables on page 9

At least 300mm



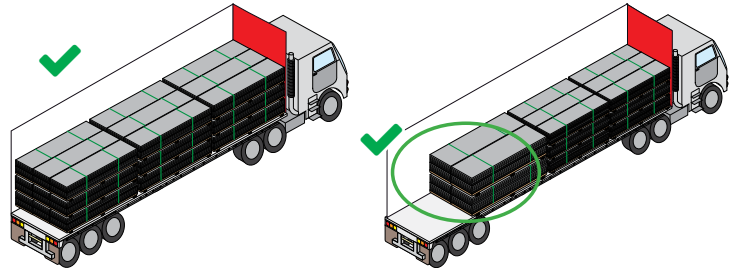
Top pack on three or more abreast must be at least 300mm high

**Key Assumptions:**

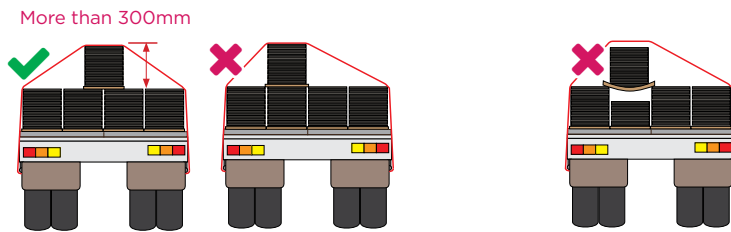
- Static friction of all materials of 0.4 or greater when packed or loose
- Webbing average tension of 300kg or 600kg over the load for standard or high pre-tension ratchets respectively
- Headboards are rated to 30% of total load mass or greater
- Products are packed to USG Boral standards

**Load Configurations - Sheet Products: 3 or more across deck**

- ✓ All stacks more than two abreast must be blocked to an engineered headboard.
- ✓ All stacks more than two abreast must be blocked rearward by a rear wall of a tautliner or a two abreast stack of product.
- ⚠ Maximum height limits apply to multi-abreast product stacks.
- ⚠ Top pack of a pyramid stack, must be at least 500mm high inclusive of pallet or dunnage.

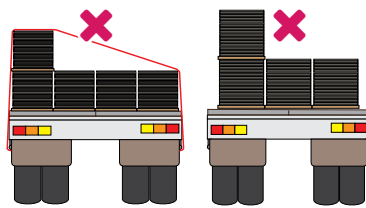


Multi-abreast loads with more than two abreast must be blocked rearwards by two-abreast stacks or tautliner rear wall



Centre loads for pyramid stacks

Do not bridge dunnage or pallets



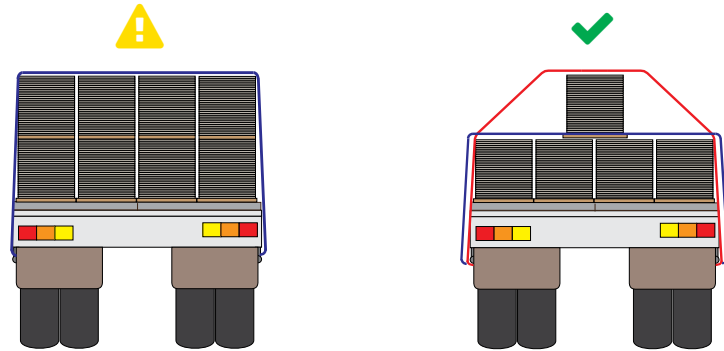
Multi-abreast pyramid loads must be centrally loaded



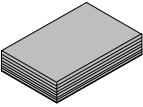
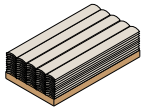
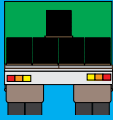
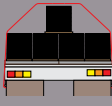
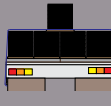
Three or more packs across must be blocked front and rear

**Load Configurations – Sheet Products: 3 or more across deck**

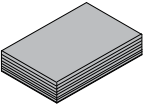
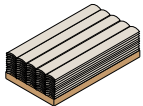
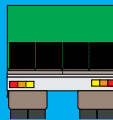

- ✓ Multi-abreast loads can be flat top or pyramid loaded.
- ✓ All stacks must be blocked to engineered headboard and lashed as per Tables 1 and 2.
- ✓ Pyramid stacks will require belly lashings and additional lashings over the top pack as per Table 1



**Table 1: Blocked (Headboard)**

 Sheets   Cornice	Stack mass restrained 	Required number of tie down lashings per stack on the vehicle				Max stack height above deck
		Pyramid lashing 		Belly lashing 		
		Push up ratchet / drum winch	Pull down Ratchet	Push up ratchet / drum winch	Pull Down Ratchet	
0 – 2,000 kg	2	2	2	2	0.9	
2,001 – 4,000 kg	2	2	2	2	1	
4,001 – 6,000 kg	3	2	3	2	1.2	
6,001 – 7,000 kg	4	2	4	2	1.2	
7,001 – 9,000 kg	5	3	5	3	1.4	
9,001 – 11,000 kg	6	4	6	4	1.5	

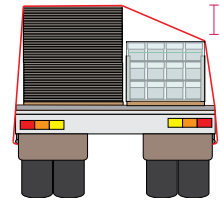
**Table 2: Blocked (Headboard)**

 Sheets   Cornice	Stack mass restrained 	Required number of tie down lashings per stack on the vehicle (lashing angle)		Max stack height above deck
		(80-90°) 		
		Push up ratchet / drum winch	Pull down ratchet	
0 – 2,000 kg	2	2	0.9	
2,001 – 4,000 kg	2	2	1	
4,001 – 6,000 kg	3	2	1.2	
6,001 – 7,000 kg	4	2	1.2	
7,001 – 9,000 kg	5	3	1.4	
9,001 – 11,000 kg	6	3	1.5	
11,001 – 13,000 kg	6	3	1.6	

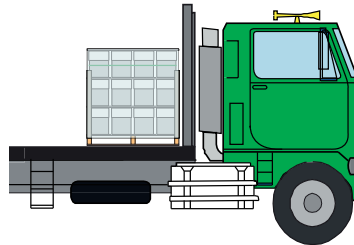
### Load Configurations - Mixed loads



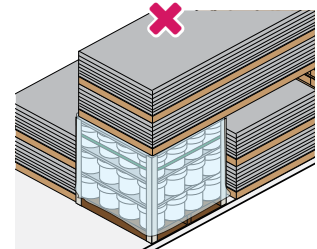
⚠ Compound product must be packed to meet NTC Performance Standards requirements



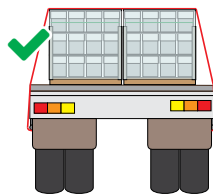
⚠ Maximum height difference across the truck is 300mm



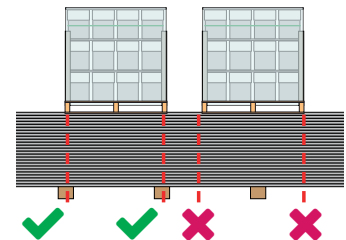
✓ Block compound product wherever possible



Do not stack sheet product on top of compound product



Load pallets maximum two abreast



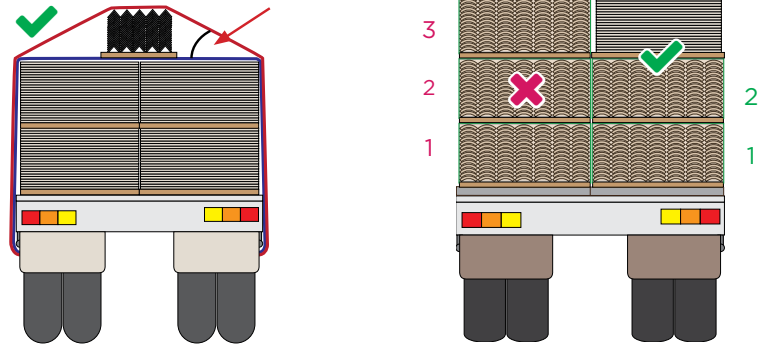
Pallets stacked on loose sheet product - bearers must align with the supporting dunnage

**Load Configurations -  
Palletised cornice product  
and steel packs**

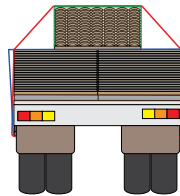
Angle for determining restraint lashings for steel packs

Steel packs should be blocked to headboards loaded centrally and restrained with the tables on page 10 using the angle shown

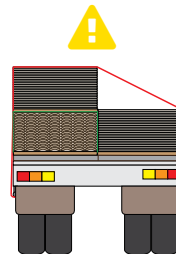
Flat product should be secured separately also using tables on page 10



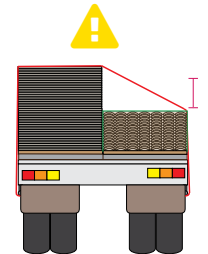
- ⚠ Do not stack cornice more than two packs high
- ✓ Palletised sheets on top of cornice are okay



- ✓ Stack cornice packs on top of sheet packs



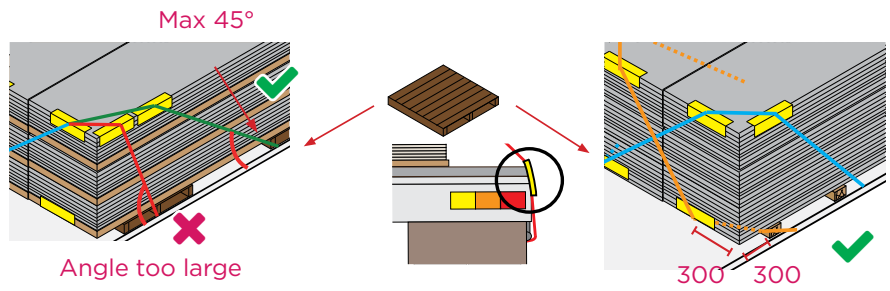
- ⚠ Crush hazard
- ✗ Do not stack sheet product on top of cornice product



- ⚠ No more than 300mm
- Maximum height difference across the truck is 300mm

## Blocking with crossover straps using pull down ratchets - Palletised sheet load

### Key Elements:

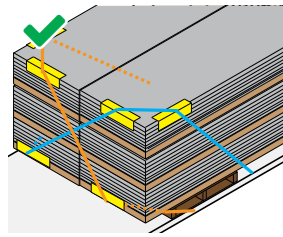


Raise load by placing pallet under first layer  
Maximum angle of crossover lashings to horizontal is 45°

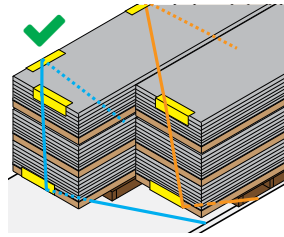
Wear sleeves to protect webbing on coaming rail

Set lower crossover strap approx 300mm back and across from outer corner

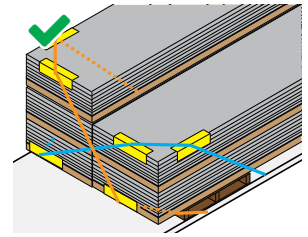
### Permissible Arrangements:



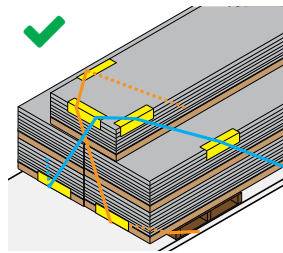
Same height, no offset



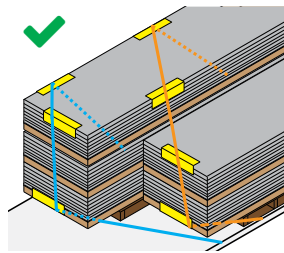
Same height, offset



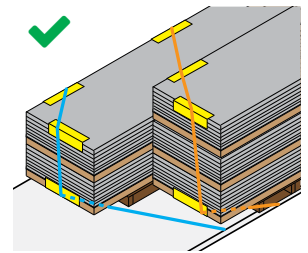
Different height, no offset



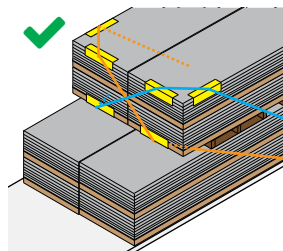
Pyramid stacked, no offset



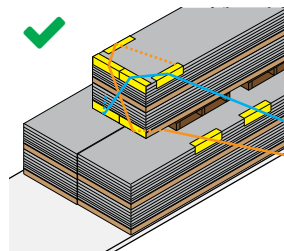
Different height, offset driver's side



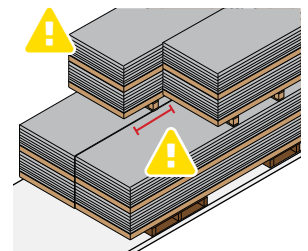
Different height, offset passenger side



Stacked, upper offset, flat face



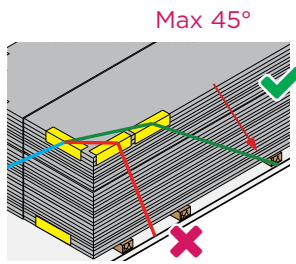
Stacked, single upper offset



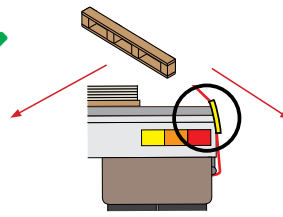
Do not apply cross over lashings to this configuration. Lash as an unblocked load - see table 3 below

**Blocking with crossover straps using pull down ratchets - Loose sheet load**

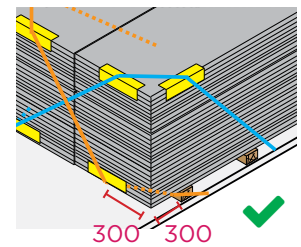
**Key Elements:**



Maximum angle of crossover lashings to horizontal is 45°

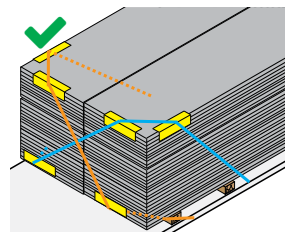


Raise load by placing dunnage or billets under first layer  
Wear sleeves to protect webbing on coaming rail

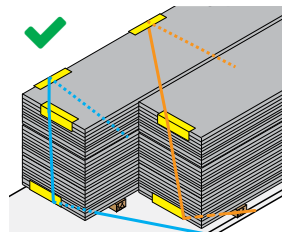


Set lower crossover strap approx 300mm back and across from outer corner

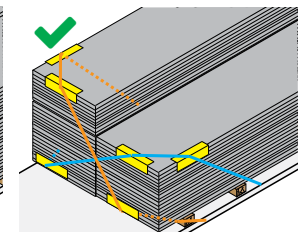
**Permissible Arrangements:**



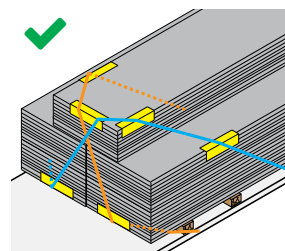
Same height, no offset



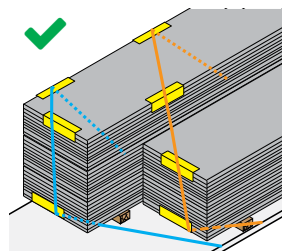
Same height, offset



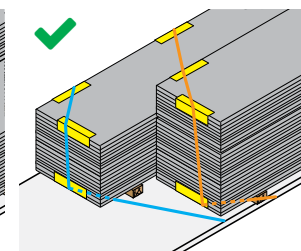
Different height, no offset



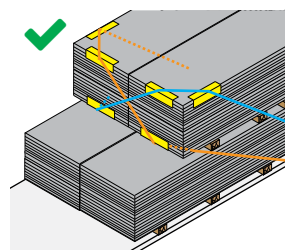
Pyramid stacked, no offset



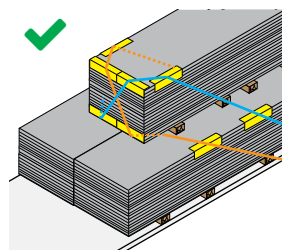
Different height, offset driver's side



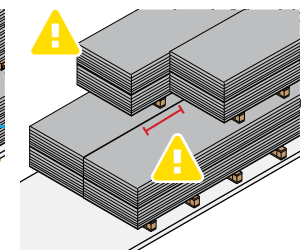
Different height, offset passenger side



Stacked, upper offset, flat face



Stacked, single upper offset



Do not apply cross over lashings to this configuration. Lash as an unblocked load - see table 3 below

## Tie Down Lashing Requirements

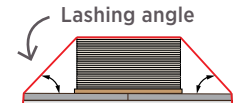


Table 3: Unblocked Configuration (\* = impractical)

Stack mass restrained 	Lashings per stack two abreast loads 		Lashings per stack single file loads 					
	(81-90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet
0 - 2,000 kg	4	2	4	3	5	3	7	4
2,001 - 4,000 kg	8	4	8	5	10	6	14*	8
4,001 - 6,000 kg	11	6	12*	7	15*	8	20*	11
6,001 - 8,000 kg	15*	8	16*	9	19*	11	27*	15*
8,001 - 10,000 kg	18*	10	20*	11	24*	13*	34*	19*
10,001 - 12,000 kg	22*	12*	22*	13*	Load configuration not possible		Load configuration not possible	
12,001 - 14,000 kg	25*	14*	24*	15*				
14,001 - 15,000 kg	27*	15*	27*	16*				

Table 4: Blocked Configuration (Two Crossover Straps) (\* = impractical)

Stack mass restrained 	Lashings per stack two abreast loads 		Lashings per stack single file loads 					
	(81-90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet
0 - 2,000 kg	2	2	2	2	2	2	2	2
2,001 - 4,000 kg	3	2	3	2	4	2	2	2
4,001 - 6,000 kg	4	3	4	3	6	4	7	4
6,001 - 8,000 kg	6	4	6	4	9	5	14*	8
8,001 - 10,000 kg	9	5	9	6	13*	7	20*	11
10,001 - 12,000 kg	13*	7	13*	8	Load configuration not possible		Load configuration not possible	
12,001 - 14,000 kg	16*	9	16*	10				
14,001 - 15,000 kg	18*	10	20*	11				

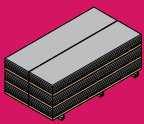


Table 5: Blocked Configuration (Headboard)

Stack mass restrained 	Lashings per stack two abreast loads 		Lashings per stack single file loads 					
	(81-90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet
0 - 2,000 kg	2	2	2	2	2	2	2	2
2,001 - 4,000 kg	2	2	2	2	2	2	4	2
4,001 - 6,000 kg	3	2	3	2	4	2	5	3
6,001 - 8,000 kg	4	3	4	3	5	3	7	4
8,001 - 10,000 kg	5	3	5	3	6	4	9	5
10,001 - 12,000 kg	6	3	6	4	Load configuration not possible		Load configuration not possible	
12,001 - 14,000 kg	7	4	7	4				
14,001 - 15,000 kg	7	4	8	5				

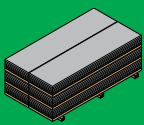


**Tie Down Lashing Requirements: Stacks greater than 15t mass**



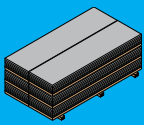


**Table 6: Unblocked Configuration (\* = impractical)**

Stack mass restrained 	Lashings per stack two abreast loads 		Lashings per stack single file loads 					
	(81-90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet
15,001 – 16,000 kg	29*	16	31*	17*	Load configuration not possible		Load configuration not possible	
16,001 – 17,000 kg	30*	17*	33*	18*				
17,001 – 18,000 kg	32*	18*	35*	19*				
18,001 – 19,000 kg	34*	19*	37*	20*				
19,001 – 20,000 kg	36*	20*	39*	21*				

**Table 7: Blocked Configuration (Crossover Straps) (\* = impractical)**

Stack mass restrained 	Lashings per stack two abreast loads 		Lashings per stack single file loads 					
	(81-90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet
15,001 – 16,000 kg	20*	11	22*	12	Load configuration not possible		Load configuration not possible	
16,001 – 17,000 kg	21*	12	24*	13				
17,001 – 18,000 kg	23*	13	26*	14				
18,001 – 19,000 kg	25*	14	28*	16				
19,001 – 20,000 kg	27*	15	30*	17				

**Table 8: Blocked Configuration (Headboard)**

Stack mass restrained 	Lashings per stack two abreast loads 		Lashings per stack single file loads 					
	(80-90°)		(60-80°)		(46-60°)		(30-45°)	
	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet	Push up ratchet / drum winch	Pull down ratchet
15,001 – 16,000 kg	8	4	8	5	Load configuration not possible		Load configuration not possible	
16,001 – 17,000 kg	8	5	9	5				
17,001 – 18,000 kg	8	5	9	5				
18,001 – 19,000 kg	9	5	10	6				
19,001 – 20,000 kg	9	5	10	6				

**Note:** Any single package must have a minimum of 15 sheets. All calculations for lashing numbers based on using a 600kg pretensioned strap and Ratchet, any variation in pretension value on an alternative strap would require recalculation.

**ENQUIRIES**

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